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| 10/553,442 | 02/03/2006 | Takumi Katsurao | 2005_1625A | 1435 |

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| EXAMINER | |
|---|---|
| CHEUNG, WILLIAM K | |

| ART UNIT | PAPER NUMBER |
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| 1796 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/553,442 | KATSURAO ET AL. | |
| | Examiner | Art Unit | |
| | WILLIAM K. CHEUNG | 1796 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *101405*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4-7, 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Muller et al. (US 5,066,401).

> 1. (Original) A porous membrane of vinylidene fluoride resin, comprising: a copolymer of 100 mols of a vinylidene fluoride monomer and 0.01 – 10.0 mols of a hydrophilic monomer having at least one species of hydrophilic group selected from epoxy group, hydroxy group, carboxy group, ester group, amide group and acid anhydride group.

Muller et al. (abstract) disclose a PVDF porous membrane grafted with oligomeric chains comprising hydrophilic monomer such as acrylic acid/methacrylic acid (col. 1, line 61), vinylacetate (col. 2, line 22, 59), acrylamide (col. 2, line 58), maleic acid ester (which include maleic anhydride) (col. 2, line 58). Further, Muller et al. (col. 19, example 24) disclose that the porous membrane comprise PVDF copolymers in the form of hollow fiber. Regarding the treatment with a basic solution, Muller et al. col. 15, example 11; col. 18, example 23) clearly teach that the PVDF porous membranes have been treated with a basic solution. Therefore, claims 1, 4-7, 10-11 are anticipated.

3. Claims 1, 3-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Joffee et al. (US 4,855,163).

Joffee et al. (col. 9-10, examples 1-5; col. 10, Table 1) disclose the grafting of acrylic acid (4 wt% solution) onto a PVDF porous membrane. Further, Joffee et al. (col. 5, line 45-49) disclose that 2-hydroxyethy acrylate or methacrylate can also be used. Although Joffee et al. do not disclose the amount of monomers are grafted, in view of the broad range of comonomers (0.01-10.0 mols) as claimed in claim 1, the examiner has a reasonable basis that the claimed amount is inherently possessed in Joffee et al.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 8-9 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Muller et al. (US 5,066,401).

Muller et al. (abstract) disclose a PVDF porous membrane grafted with oligomeric chains comprising hydrophilic monomer such as acrylic acid/methacrylic acid (col. 1, line 61), vinylacetate (col. 2, line 22, 59), acrylamide (col. 2, line 58), maleic acid ester (which include maleic anhydride) (col. 2, line 58). Further, Muller et al. (col. 19, example 24) disclose that the porous membrane comprise PVDF copolymers in the form of hollow fiber. Regarding the treatment with a basic solution, Muller et al. col. 15, example 11; col. 18, example 23) clearly teach that the PVDF porous membranes have been treated with a basic solution. In view of the substantially identical composition of the PVDF porous membrane disclosed in Muller et al. and as claimed, the examiner has a reasonable basis that the claimed melting point of claim 8 and the inherent viscosity of claim 9 are inherently possessed in Muller et al. Since the PTO does not have proper means to conduct experiments, the burden of proof is now shifted to applicants to show otherwise. In re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977); In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

7. Claims 8-9 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Joffee et al. (US 4,855,163).

Joffee et al. (col. 9-10, examples 1-5; col. 10, Table 1) disclose the grafting of acrylic acid (4 wt% solution) onto a PVDF porous membrane. Further, Joffee et al. (col. 5, line 45-49) disclose that 2-hydroxyethy acrylate or methacrylate can also be used. Although Joffee et al. do not disclose the amount of monomers are grafted, in view of

the broad range of comonomers (0.01-10.0 mols) as claimed in claim 1, the examiner has a reasonable basis that the claimed amount is inherently possessed in Joffee et al. In view of the substantially identical composition of the PVDF porous membrane disclosed in Joffee et al. and as claimed, the examiner has a reasonable basis that the claimed melting point of claim 8 and the inherent viscosity of claim 9 are inherently possessed in Joffee et al. Since the PTO does not have proper means to conduct experiments, the burden of proof is now shifted to applicants to show otherwise. In re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977); In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

8. Claims 2-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muller et al. (US 5,066,401) in view of Steuck (US 4,618,533).

Muller et al. (abstract) disclose a PVDF porous membrane grafted with oligomeric chains comprising hydrophilic monomer such as acrylic acid/methacrylic acid (col. 1, line 61), vinylacetate (col. 2, line 22, 59), acrylamide (col. 2, line 58).

The difference between the invention of claims 2-6 and Muller et al. is that Muller et al. do not teach a PVDF copolymer comprising hydroxylethyl methacrylate or acrylate, or glycidyl acrylate.

However, Steuck (col. 9, example 34) disclose the use of hydroxylpropyl acrylate and glycidal acrylate in the coating process of a PVDF porous membrane. Steuck (col. 3, line 46-60) also disclose that acrylic acid, hydroxyethyl acrylate, hydroxyethy methacrylate, 2-N,N-dimethylaminoethyl methacrylate, methacrylamides and

acrylamides can also be used in place of hydroxylpropyl acrylate. Motivated by the expectation of success of further improving the hydrophilic surface of the PVDF porous membrane, it would have been obvious to one of ordinary skill in art to incorporate the coating technology as taught in Steuck into Muller et al. to obtain the invention of claims 2-6.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muller et al. (US 5,066,401) in view of Takamura et al. (US 6,299,773).

> 12. (Original) A process for producing a porous membrane of vinylidene fluoride resin comprising: mixing 100 wt. parts of a vinylidene fluoride resin including a copolymer of 100 mols of a vinylidene fluoride monomer and 0.01 – 10.0 mols of a hydrophilic monomer having at least one species of hydrophilic group selected from epoxy group, hydroxy group, carboxy group, ester group, amide group and acid anhydride group with 70 – 250 wt. parts of a plasticizer and 5 – 80 wt. parts of a good solvent for the copolymer to provide a composition; melt-extruding the composition into a film; cooling the film preferentially one side thereof to solidify the film; extracting the plasticizer; and further stretching the film.

Muller et al. (abstract) disclose a PVDF porous membrane grafted with oligomeric chains comprising hydrophilic monomer such as acrylic acid/methacrylic acid (col. 1, line 61), vinylacetate (col. 2, line 22, 59), acrylamide (col. 2, line 58).

The difference between the invention of claim 12 and Muller et al. is that Muller et al. do not teach the process for preparing the PVDF porous membrane same as the process of claim 12.

However, Takamura et al. (col. 8, example 1) teach a process for preparing a porous PVDF membrane involving extruding the PVDF resins and fiber spinning (stretching process and cooling) for forming the hollow fiber. The process also involves the extraction with sodium hydroxide of the plasticizers out of the PVDF to make the PVDF membrane to become porous. Motivated by the expectation of success of preparing a porous PVDF membrane, it would have been obvious to one of ordinary skill in art to employ the process of Takamura et al. to prepare the PVDF porous membrane of Muller et al. to obtain the invention of claim 12. Although the process sequence is not identical to the process sequence as claimed, in view of MPEP 2144.04 (C), the rearrangement of the process steps is considered obvious. In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results).

C. Changes in Sequence of Adding Ingredients

*Ex parte Rubin* , 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render *prima facie* obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results); *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is *prima facie* obvious.).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM K. CHEUNG whose telephone number is

(571)272-1097. The examiner can normally be reached on Monday-Friday 9:00AM to 2:00PM; 4:00PM to 8:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David WU can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William K Cheung/
Primary Examiner, Art Unit 1796

William K. Cheung, Ph. D.
Primary Examiner
December 15, 2008